

Amendments to the Drawings:

The attached sheets of drawings include Figs. 4A, 4B, 5A and 5B. These figures are SEM photographs that correspond to original Figs. 4A, 4B, 5A and 5B, but which are now shown with improved clarity. These two replacement sheets replace the original two drawing sheets including Figs. 4A, 4B, 5A and 5B. Applicants respectfully submit that that no changes have been made and no new matter has been added.

Attachments: (2) Replacement Drawing Sheets

REMARKS/ARGUMENTS

Claims 1-11 are pending herein. Claims 1-3 and 5-10 have been amended hereby to correct matters of form and for clarification purposes only. Claim 4 has been rewritten in independent form. New claim 11 has been added hereby, depending from rewritten claim 4, as supported by Fig. 1B, for example. Applicants respectfully submit that no new matter has been added.

1. Examiners Bauer and Nguyen are thanked for the courtesies extended to Applicants' representatives (Steve Burr and Nicole Buckner) during a telephonic interview on October 5, 2006, the substance of which is incorporated hereinbelow.
2. The drawing objection is noted, but deemed moot in view of the Replacement Drawing Sheets submitted herewith. As described on page 8 of this Amendment, no changes have been made to Figs. 4A, 4B, 5A and 5B, rather, the replacement sheets merely contain the best available versions of the same SEM photos shown in original Figs. 4A, 4B, 5A and 5B. During the telephonic interview, Examiner Bauer indicated that he would accept such replacement sheets. Accordingly, Applicants respectfully request that the above objection be reconsidered and withdrawn.
3. Claims 1-10 were rejected under §103(a) over Tamagawa in view of Fujii (JP '584), Shinkai (JP '673) and Hiramatsu (WO '972). Applicants respectfully traverse this rejection. To the extent that the PTO may attempt to assert this rejection against new dependent claim 11, it is respectfully traversed.

Independent claim 1 recites a bonding member comprising a ceramic member having a concave portion and a metal member having a convex portion fitted to the concave portion of the ceramic member. A first bonding material is provided, joining a bottom portion of the concave portion of the ceramic member and a tip portion of the convex portion of the metal member. The first bonding material has a porous structure including particles and a brazing filler metal, and covers a corner between a tip portion

and a side portion of the metal member. A second bonding material is also provided, including a brazing filler metal, joining a side portion of the concave portion of the ceramic member and a side portion of the convex portion of the metal member.

Rewritten independent claim 4 recites a bonding member having the same features as the bonding member of claim 1, and also including at least one vent hole penetrating through the metal member in at least one of a vertical direction and a horizontal direction from an inside portion of the convex portion of the metal member to an outer surface of the metal member.

Independent claim 5 recites an electrostatic chuck for adsorbing an object to be processed. The electrostatic chuck comprises a substrate including an electrode therein and having a concave terminal bonding hole, and a terminal member made of a different material from that of the substrate which supplies power to the electrode. A bottom portion bonding material joins a bottom portion of the terminal bonding hole of the substrate and a tip portion of the terminal. The bottom portion joining material has a porous structure including particles and brazing filler metal and covers a corner between a tip portion and a side portion of the terminal member. A side portion bonding material including a brazing filler metal joins a side portion of the terminal bonding hole of the substrate and a side portion of the terminal member.

The above obviousness rejection was asserted based on the application of four references in an attempt to cover all of the claimed features. Applicants respectfully submit, however, that one skilled in the art would not have been motivated to combine these many references, particularly not in the manner suggested in the Office Action, for at least the reasons explained during the October 5, 2006 telephonic interview with Examiners Bauer and Nguyen, which are outlined below.

Referring to Fig. 17 of Tamagawa, a metal member is bonded to a ceramic member through a brazing layer 32, which is used to provide the physical connection therebetween at the end and side edge surfaces of the metal member 22. An annular gap remains between the side portions of the metal member 22 and the ceramic member 12/18 on either side thereof. That gap is filled with a PbSn solder material 34

in order to prevent the loss of thermal conductivity from the dielectric (ceramic) member 12/18. In addition, the solder material 34 is softer than the ceramic, and serves to absorb thermal expansions and contractions of the ceramic member 12/18 upon heating and cooling during use (see Tamagawa, Col. 9, lines 24-50).

In view of the fact that Tamagawa's brazing material does not correspond to the claimed first bonding material, Examiner Bauer applied Shinkai, and asserted that it would have been obvious to use Shinkai's brazing material in Tamagawa's structure to provide a stronger bond. Applicants respectfully submit, however, that there is no evidence in the record that Shinkai's brazing material would provide a stronger or better bond than that which is already provided by Tamagawa's brazing layer 32. Indeed, such a conclusion is speculative at best, and mere speculation is not sufficient to motivate one skilled in the art to replace a major bonding material with another material without first having any reasonable expectation of achieving improved results. Moreover, Applicants respectfully submit that there is no evidence that the brazing layer 32 in Tamagawa is in any way insufficient so as to motivate one skilled in the art to seek out some kind of "improved" replacement brazing/bonding material.

Examiner Bauer also applied Hiramatsu in an attempt to provide a bonding material to correspond to the claimed second bonding material. Along those lines, Examiner Bauer asserted that one skilled in the art would understand that a brazing material (like in Hiramatsu) is used interchangeably with a solder material (like 34 in Tamagawa), so that one skilled in the art would have been motivated to make such a substitution in the structure in Tamagawa. Applicants respectfully submit, however, that Hiramatsu does not explicitly teach such blanket interchangeability, that one skilled in the art would not assume that kind of interchangeability, and that such an assertion is conclusory and unsupported.

Even if, *arguendo*, Hiramatsu were to teach that solder and braze could be used as interchangeable bonding materials, Applicants respectfully submit that there is no evidence that such an otherwise allegedly "interchangeable" material, like Hiramatsu's brazing material, would necessarily provide better joining conditions than those which

are already achieved by Tamagawa's solder. Moreover, Applicants respectfully submit that one skilled in the art still would not have been motivated to use Hiramatsu's brazing material instead of Tamagawa's soft solder 34 in Tamagawa's structure, because to do so would be to modify Tamagawa's structure in manner that directly contradicts the function and purpose of providing the soft solder 34 in Tamagawa's structure in the first place.

For example, as mentioned above, the soft solder 34 in Tamagawa is provided to fill the gap between the dielectric 12 and the metal member 22 to compensate for and prevent thermal conductivity losses, and to compensate for thermal expansion and contraction behaviors of the dielectric 12 during use. That is, the critical bonding between the metal member and the ceramic (dielectric) member in Tamagawa's structure is achieved by the brazing layer 32, not the soft solder 34, which instead serves as an essential filler and buffer, as explained above. As Applicants' representatives explained during the telephonic interview, replacing the soft solder of Tamagawa with a hard bonding braze according to Hiramatsu would not be necessary to facilitate the bonding in Tamagawa's structure, because that is instead already achieved by a different material (i.e., the brazing layer 32). Moreover, Applicants respectfully submit that it would actually be detrimental to Tamagawa's structure to bond those surfaces with a braze, like in Hiramatsu, instead of providing the solder for the intended purpose and function of serving as the filler/buffer layer. Examiner Bauer tentatively agreed that Tamagawa teaches away from such a substitution in view of the points outlined above, and tentatively agreed to withdraw the above rejection for at least this reason.

With respect to the vent hole structure recited in independent claim 4, Applicants respectfully submit that the claimed vent holes are provided to ensure that air is not trapped within the bonding structure during bonding so as to provide sufficient mechanical strength and electrical conductivity. Applicants respectfully submit, however, that the hole 36 shown in Fig. 17 of Tamagawa is not the same as the claimed vent hole(s), because the hole 36 does not penetrate entirely through the

metal member 22, in the claimed manner. Applicants respectfully submit that there is nothing in the record that would have motivated one skilled in the art to modify Tamagawa's structure to extend the hole to pass entirely through the metal member 22.

New dependent claim 11 recites that the at least one vent hole comprises a first vent hole passing through the metal member in the vertical direction, such as the vertical vent hole 6 shown in Fig. 1B, for example, and a second vent hole passing through the metal member in the horizontal direction, such as the horizontal vent hole 7 shown in Fig. 1B, for example. During the telephonic interview, Examiner Bauer agreed that the claimed vent holes, which pass entirely through the metal member from an inside portion thereof, are not disclosed or suggested in the applied references.

While Examiner Bauer also relied on Fujii in an attempt to find structures having the concave/convex features recited in the pending claims, Applicants respectfully submit that one skilled in the art still could not have arrived at the present invention in view of the applied references for at least the other reasons explained above. Moreover, Applicants respectfully submit that Examiner Bauer's assertions that Fujii's structure would have provided reduced terminal edge stress were derived based on statements provided in Applicants' own disclosure, which is impermissible. Even so, these speculations allegedly based on Fujii are not even relevant in view of the various other deficiencies in the many applied references explained above.

For at least the foregoing reasons, Applicants respectfully submit that all claims pending herein define patentable subject matter over the applied references, and respectfully request that the above rejection be reconsidered and withdrawn.

If Examiner Bauer believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, he is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

October 11, 2006

Date



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SPB/NB/gmh

Attachments: Appendix A - substitute specification
Appendix B - marked-up specification
(2) Replacement Drawing Sheets

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